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**From impulse to action among military personnel hospitalized for suicide risk:
Alcohol consumption and the reported transition from suicidal thought to behavior**

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Abstract

Objective: Alcohol use is associated with unplanned or impulsive suicide attempts. Although unplanned suicide attempts assume a rapid transition for suicidal impulse to action, many studies do not quantify the time elapsed from suicidal impulse to action. The current study was designed to clarify how alcohol use facilitates the transition from suicidal impulse to action among U.S. Army personnel. We hypothesized that alcohol consumption during the 24 hours preceding a suicide attempt would be associated with significantly faster transition from suicidal impulse to action, but would be unrelated to medical lethality.

Method: 119 active duty U.S. Army Soldiers who made a total of 175 suicide attempts during military service, 121 of which occurred during the preceding year, completed clinician-administered structured interviews focused on psychiatric diagnosis and the contextual characteristics of their suicide attempts.

Results: Alcohol use during the 24 hours prior to a suicide attempt was associated with significantly faster transition from suicidal impulse to action. Among suicide attempts in the past year, lethality significantly increased as the length of time since the last alcoholic drink increased. Drug use during the 24 hours prior to a suicide attempt was unrelated to speed of transition or attempt lethality.

Conclusions: Soldiers acted upon their suicidal impulses more quickly when they had been drinking on the day of their suicide attempts. This rapid transition may contribute to the selection of less lethal suicide methods during periods of active drinking as compared to methods selected after the discontinuation of alcohol consumption.

Key Words: military; suicide; alcohol; impulsivity; lethality

1. Introduction

Although the suicide rate among members of the U.S. Armed Forces has traditionally been lower than that of the age- and gender-matched U.S. general population suicide rate, in 2008 the military suicide rate surpassed the general population rate and has remained elevated since [1]. The considerable difficulty in reliably predicting suicidal behavior has contributed to a widespread perspective of suicide as an “impulsive” behavior [2]. Supporting this perspective are findings indicating that the transition from suicide ideation to attempts typically occurs in less than one year among military personnel and veterans [3, 4]. Furthermore, of those Soldiers who make a suicide attempt during military service, approximately 15% have been described as “unplanned,” which refers to suicide attempts made by individuals who report a history of suicide attempt but deny ever making an explicit suicide plan [3, 5]. This notion of the unplanned or “impulsive” suicide attempt has been similarly described and reported among non-military populations [e.g., 6, 7, 8].

Because of the strong associations among trait impulsivity, initiation of substance use, and the dysregulatory effects of substance use on impulse control [9], alcohol and drug use may play a particularly important role in unplanned suicide attempts. Indeed, the strong relationship of substance use and suicidal behavior is due in large part to its association with unplanned, as opposed to planned, suicide attempts [6]. Although the risk for suicide attempts is highest among those meeting diagnostic criteria for a substance use disorder [6, 7], unplanned suicide attempts are also associated with amount of daily consumption of alcoholic beverages regardless of diagnosis [7] and are more likely to occur during heavy drinking episodes, especially among men [10]. In contrast to alcohol consumption, unplanned suicide attempts may be less likely to occur during periods of active drug use [11]. In light of these findings, alcohol use has been proposed

to be a warning sign for near-term or imminent suicidal behavior [12, 13]. Although alcohol use is associated with less advance planning, it is not associated with attempt lethality or attempt method [14], which suggests that risk for suicidal behavior is increased by alcohol use because alcohol use reduces the predictability (or, conversely, increases the suddenness) of the eventual suicidal act.

Existing research is marked by several limitations, however, the most notable of which is how unplanned suicidal behavior is operationalized. As noted above, unplanned suicide attempts are defined in many studies as suicide attempts made by individuals who denied making a suicide plan in advance [3, 5-8]. Such studies are based on several assumptions about the temporal sequencing of suicidal thoughts and behaviors; specifically, that suicide ideation precedes suicide planning, and that suicide planning precedes suicide attempts. This hierarchy of risk is supported to some degree by findings indicating that suicidal planning is associated with greater risk for suicidal behavior as compared to suicidal thinking and ideation more generally [15, 16]. Suicide planning can therefore be conceptualized as a particularly high-risk “subtype” of suicide ideation. Recent conceptual and empirical research suggests, however, that this linear model of progression from suicide ideation to plans to attempts may oversimplify the true nature of the emergence of suicidal behavior from suicidal thoughts [17].

According to the fluid vulnerability theory, for instance, suicide risk is a dynamic construct that is best characterized by fluctuations around stable set points [18]. Consistent with this perspective, individuals who attempt suicide are nearly three times more likely to describe the process leading up to their attempts as fluctuating and nonlinear in nature [17]. Wyder and De Leo further reported that more than two-thirds of individuals who made unplanned or impulsive suicide attempts described a nonlinear, fluctuating process leading up to the attempt

whereas only 7% of impulsive attempts were preceded by a linear progression from lower to higher levels of suicidal thinking (the highest being suicide planning). Because most studies do not take into account nonlinear change processes, suicidal behavior can appear to be unplanned even when it is actually preceded by a nonlinear temporal trajectory such as an oscillatory pattern marked by periodic and/or rhythmic fluctuations. Research on impulsive suicide attempts is further limited by findings that 27% of suicide attempters who described their attempts as “impulsive” also report having making a suicide plan at some point prior to their attempt, and 29% of suicide attempters who described their attempts as “non-impulsive” did not report making a suicide plan at any point prior to their attempt [17]. Alternative methods for examining how factors such as substance use are associated with the transition from suicidal thought to action are therefore needed.

One possible alternative is the assessment of elapsed time from the decision to act upon a suicidal impulse (e.g., “I’m going to do it”) to the suicide attempt itself. Assessing elapsed time in terms of seconds, minutes, hours, or days, provides a more objective metric for quantifying the transition from impulsive to reflective action [19] while also aligning with more traditional conceptualizations of unplanned versus planned suicidal behavior. For example, shorter periods of time (e.g., seconds or minutes) from suicidal impulse to action might correspond to “unplanned” or “impulsive” suicide attempts whereas longer periods of time (e.g., hours or days) might correspond to more “planned” or “reflective” attempts. Such an approach may provide a more nuanced understanding of the role of substance use in the emergence of suicidal behavior, especially among high-risk populations such as the military, a group for whom little is known about substance use immediately prior to suicidal behavior.

The primary aim of the present study was to examine the associations of alcohol and drug use with suicidal behavior in a sample of active duty military personnel who attempted suicide during military service. Consistent with prior research, we hypothesized that alcohol consumption, but not drug use, during the 24 hours preceding Soldiers' suicide attempts would be associated with significantly faster transition from suicidal thought to action. We also hypothesized that neither alcohol nor drug use would be associated with the medical lethality of the suicide attempt. In addition to these a priori hypotheses, we conducted exploratory analyses to examine how different dimensions of substance use on the day of suicidal behavior (i.e., amount used, duration of acute substance use, length of time of continued or discontinued use relative to a suicide attempt) might be correlated with speed of transition from suicidal to action and suicide attempt lethality.

2. Method

2.1. Participants and Procedures

Participants included 119 active duty Soldiers (106 men, 13 women) ranging in age from 19 to 44 years ($M=27.03$, $SD=6.16$) who had made at least one suicide attempt during military service. Self-identified racial distribution was 81 (68.1%) Caucasian, 15 (12.6%) African-American, 6 (5.0%) Native American, 3 (2.5%) Pacific Island, 3 (2.5%) Asian, and 11 (9.2%) other. Hispanic/Latino ethnicity was assessed separately and was endorsed by 29 (24.4%). Rank distribution was 85 (71.4%) E1-E4, 29 (24.4%) E5-E6, and 5 (4.2%) E7-E8. The majority of participants (83.2%) had deployed at least one time ($M=1.63$, $SD=1.40$, range: 0 to 8). Approximately half (49.6%) of the participants had made two or more lifetime suicide attempts.

Soldiers were referred for an intake evaluation following discharge from inpatient psychiatric hospitalization to determine eligibility for enrollment in a randomized clinical trial

[20]. Soldiers interested in enrolling completed the informed consent process, after which they completed structured clinical interviews and self-report measures. Inclusion criteria for the parent study included active duty military service, age 18 or older, and a lifetime history of suicide attempt. The only exclusion criterion was the presence of a medical or psychiatric condition that precluded informed consent (e.g., acute intoxication, impaired consciousness, mania, psychosis). The present study was reviewed and approved by the Institutional Review Board at Madigan Army Medical Center.

2.2. Instruments

2.2.1. Suicide Attempt Self Injury Interview (SASII). The SASII [21] is a structured clinician-administered interview designed to assess the characteristics of intentional self-injurious behaviors (e.g., intent, method, medical lethality) in order to accurately differentiate between suicide attempt and nonsuicidal self-injury. Participants were asked to describe the circumstances leading up to their suicide attempt, to include the amount of time spent planning in advance. Time elapsed from suicidal impulse to suicide attempt was scored by the evaluator on the following 7-point scale that includes scoring options that take into account both respondent appraisal of impulsivity as well as quantified periods of time:

- 1 = Commitment to act, followed by very careful or elaborate plan carried out over many days;
- 2 = Actively planned and/or got implements; had impulse, resisted for multiple days, then acted;
- 3 = Actively planned and/or got implements; had impulse, resisted for less than 24 hours;
- 4 = No active planning; had impulse, resisted for multiple days, then acted;
- 5 = No active planning; had impulse, resisted for less than 24 hours, then acted;

6 = No active planning; occurred impulsively, with no forethought and without very strong emotion (i.e., seconds to hours); and

7 = No active planning; occurred impulsively, with no forethought and with very strong emotion (i.e., seconds to hours).

Prior research indicates that higher scores on this scale (i.e., faster transition) is associated with less ambivalence when making a suicide attempt, decreased likelihood of writing a suicide note, lower suicidal intent, taking fewer steps to prevent discovery, and greater likelihood of rescue (Linehan et al., 2006). In the present study, these scores were collapsed into the four categories corresponding to different durations of time: multiple days, less than two days, less than one day, or hours or less. Response option one was categorized as “multiple days.” Response options 2 and 4 were both categorized as “less than two days” because both of these response options indicate the passage of at least 24 hours from suicidal impulse to action, although option 2 is scored when a participant describes their attempt as planned and option 4 is scored when a participant describes their attempt as unplanned” or “impulsive.” Likewise, response options 3 and 5 were categorized as “less than one day.” Finally, response options 6 and 7 were categorized as “hours or less.” Scores were recategorized in this manner to emphasize the passage of time, the objective dimension of transitioning from ideation to action, from the more subjective notions of capacity to “resist” suicidal urges and perceived role of affective state.

Regarding medical lethality ratings, the SASII uses a 6-point scale ranging from very low (e.g., scratching; minor drug overdose 1.5 times the usual dependent dose) to severe (e.g., pulling trigger of a loaded gun aimed at a vital area; hanging at a height with feet off the ground). Medical lethality scores by lay evaluators are highly correlated ($ICC=0.85$) with lethality ratings made by physicians and medical professionals.

Finally, the SASII also includes questions regarding contextual factors, events, and experiences that occurred during the 24 hours before the suicide attempt. Participants were asked the following questions regarding substance use: “During the 24 hours before your suicide attempt, did you drink alcohol?” and “During the 24 hours before your suicide attempt, did you take illegal drugs or more than the prescribed amount of medications?” Participants who endorsed alcohol consumption during the 24 hours preceding their suicide attempt were then asked how much they drank (coded in standard drink units), how many hours there were drinking, and how long before the suicide attempt they stopped drinking. One standard drink unit was defined as 12 fluid ounces of beer, 5 fluid ounces of wine, or 1.5 fluid ounces of liquor. Because the reliability and validity of these follow-up items regarding alcohol use have not yet been published, we examined the extent to which these items correlated with responses to the Alcohol Use Disorders Identification Test [22], a reliable and valid self-report scale of alcohol use that was administered immediately after the SASSI. AUDIT total score was significantly correlated with total number of drinks consumed ($r=0.24$, $p<.001$) and total number of hours drinking prior to the suicide attempt ($r=0.35$, $p<.001$). Length of time that drinking was discontinued prior to the suicide attempt was negatively correlated with AUDIT total score but was not statistically significant ($r=-0.17$, $p=.205$).

Participants were also asked, “Did any of the events or experiences on this list happen to you in the 24 hours before your suicide attempt?” Participants were then presented with a list of possible environmental circumstances and internal psychological states and asked to choose all that had been experienced.

2.2.3. Structured Clinical Interview for DSM-IV-TR (SCID). The SCID [23] is a structured clinician-administered interview designed to establish psychiatric diagnosis. The

scale's reliability and validity have been established. In the present study, the following four diagnoses were considered due to their established association with suicidal behavior in military populations: major depressive disorder, alcohol dependence, posttraumatic stress disorder (PTSD), and borderline personality disorder.

2.3. Data Analytic Approach

Chi-square analysis was used to test the univariate association of the elapsed time from suicidal impulse to action with alcohol consumption during the preceding 24 hours. Multivariate ordinal regression was used to test the association of alcohol consumption with elapsed time from suicidal impulse to action while adjusting for other contextual factors endorsed during the 24 hours immediately preceding the suicide attempts. Ordinal regression was used since the outcomes (elapsed time from suicidal impulse to action, medical lethality) were ordered categorical variables. Because some participants made multiple suicide attempts, analyses were conducted within a multilevel framework to account for nesting within individuals. Analyses were first conducted on all suicide attempts that occurred during military service and then repeated for only those suicide attempts that occurred during the past year to account for potential recall bias related to more distant suicide attempts.

3. Results

A total of 175 suicide attempts during military service were reported: 75 (63.0%) participants made one suicide attempt, 32 (26.9%) made two suicide attempts, and 12 (10.1%) made three suicide attempts during military service. Approximately three-quarters ($n=121$, 69.1%) of the assessed suicide attempts occurred within the preceding year (range: 0 to 11 years, median=0, IQR: 0-1). The proportion of suicide attempts that was preceded by each contextual factor are displayed in Table 1, along with variable intercorrelations reported as phi coefficients

for binary associations. The most common contextual factors preceding suicide attempts were feeling depressed (82.4%), interpersonal conflict (52.9%), and anxiety (51.3%). Drinking alcohol on the day of the suicide attempt was reported by 28.0% of participants and was positively correlated with feeling depressed ($\Phi=.15$, $p=.046$) and taking illegal drugs or excess prescription medications ($\Phi=.21$, $p=.004$) on the day of the suicide attempt. Drinking alcohol on the day of the suicide attempt was not associated with gender, age, race, or history of deployments, however. Nearly identical results were observed when considering only suicide attempts that occurred within the previous year (see Table 1).

Among those who reported drinking on the day of their suicide attempt, the total number of self-reported drinks (converted to standard drinks) ranged from 1 to 288 ($M=63.10$, $SD=59.38$, median=51). The mean duration of these drinking episodes was 6.63 hours ($SD=7.78$, median=3, range: 1 to 24 hours), with just over half of participants ($n=22$, 55.0%) reporting they had been drinking a total of three hours or less on the day of their suicide attempt. Nearly two-thirds of participants ($n=24$, 65.0%) indicated they continued drinking up until the moment of their suicide attempt.

When considering only suicide attempts occurring during the preceding year, the total number of self-reported standard drinks ranged from 1 to 288 ($M=63.17$, $SD=60.63$, median=57), the mean duration of drinking episodes was 2.09 hours ($SD=5.18$, median=0, range: 0 to 24 hours), and 85.3% reported they had been drinking a total of three hours or less on the day of their suicide attempt. Just over two-thirds (69.4%) indicated they continued drinking up until the moment of their suicide attempt.

3.1. Associations of psychiatric diagnosis with drinking on the day of a suicide attempt

Drinking alcohol on the day of the suicide attempt was significantly more common among participants diagnosed with major depressive disorder (30.4% vs. 8.3%; OR=4.80 [1.01, 22.72], $p=.048$) and alcohol dependence (54.5% vs. 18.8%; OR=5.17 [1.37, 19.57], $p=.016$), but was not among those diagnosed with PTSD (25.0% vs. 23.1%; OR=1.11 [0.38, 3.24], $p=.847$) or borderline personality disorder (40.0% vs. 22.7%; OR=2.28 [0.35, 14.74], $p=.389$). When all of these diagnoses were considered in combination, only alcohol dependence was associated with significantly increased likelihood of drinking alcohol on the day of the suicide attempt (AOR=4.24 [1.07, 16.79], $p=.039$).

Similar results were found when considering only suicide attempts during the preceding year. Drinking alcohol on the day of the suicide attempt was more common among participants diagnosed with major depressive disorder (35.6% vs. 17.6%; OR=2.58 [0.97, 6.92], $p=.059$), but not among those diagnosed with PTSD (29.8% vs. 31.1%; OR=0.94 [0.43, 2.09], $p=.880$), alcohol dependence (38.9% vs. 29.1%; OR=1.55 [0.55, 4.38], $p=.409$), or borderline personality disorder (35.7% vs. 29.9%; OR=1.30 [0.41, 4.19], $p=.658$). When all four diagnoses were considered in combination, only major depressive disorder was associated with an increased likelihood of drinking alcohol on the day of the suicide attempt that occurred within the preceding year (AOR=2.79 [0.95, 8.21], $p=.051$).

3.2. Association of alcohol consumption with elapsed time from suicidal impulse to action

Our first hypothesis was that alcohol consumption, but not drug use, during the 24 hours preceding Soldiers' suicide attempts would be associated with significantly faster transition from suicidal thought to action. Among all suicide attempts, a total of 2 (1.1%) participants reported the transition occurred during the course of multiple days, 36 (20.6%) reported less than two days, 5 (2.9%) reported less than one day, and 132 (75.4%) hours or less. Among suicide

attempts within the past year only, 2 (1.7%) participants reported a transition over the course of multiple days, 25 (20.7%) reported less than two days, 3 (2.5%) reported less than one day, and 91 (75.2%) reported hours or less. There was a statistically significant association between alcohol consumption and elapsed time from suicidal impulse to action when considering all suicide attempts ($\chi^2(3)=15.55$, $p=.001$, $\Phi=.30$) as well as suicide attempts during the preceding year ($\chi^2(3)=13.25$, $p=.004$, $\Phi=.33$): nearly 90% of suicide attempts that were preceded by alcohol consumption occurred within hours or less as compared to approximately 70% of suicide attempts that were not preceded by alcohol consumption. Drug use was not associated with elapsed time from suicidal impulse to action when considering all suicide attempts ($\chi^2(3)=15.55$, $p=.001$, $\Phi=.30$) or suicide attempts during the preceding year ($\chi^2(3)=1.25$, $p=.741$, $\Phi=.10$).

To further examine the association of alcohol consumption with elapsed time from impulse to action while adjusting for the effects of other contextual variables, we used multilevel ordinal regression. Results of the regression are reported in Table 2. Regardless of the timeframe considered, having an argument or conflict with another person and drinking alcohol were associated with faster transition from suicidal impulse to action, but drug use on the day of the suicide attempt was not significantly associated with speed of transition. Results remained unchanged when adjusting for age, gender, and psychiatric diagnosis. In addition, none of the four psychiatric diagnoses was associated with elapsed time.

We next conducted exploratory analyses to examine if three aspects of alcohol consumption on the day of participants' suicide attempts (i.e., total number of standard drinks consumed, total duration of time drinking, and length of time between the last alcoholic drink and the suicide attempt) were related to speed of transition. When considering all suicide attempts, speed of transition was not related to number of standard drinks ($B=0.00$, $SE=0.00$,

$p=.474$) or duration of drinking episode in hours ($B=-0.02$, $SE=0.01$, $p=.189$), but a nonsignificant trend was seen with respect to time since last drink, in hours ($B=-0.03$, $SE=0.02$, $p=.061$). When considering suicide attempts during the previous year, only time since last drink was significantly associated with elapsed time ($B=-0.05$, $SE=0.02$, $p=.018$); number of standard drinks ($B=0.00$, $SE=0.00$, $p=.388$) and duration of drinking episode ($B=-0.02$, $SE=0.02$, $p=.149$) were not.

3.3. Association of alcohol consumption with suicide attempt lethality

Overall, the mean lethality of participants' suicide attempts was high to very high among all suicide attempts ($M=4.25$, $SD=1.73$). The mean lethality level of suicide attempts did not differ between those participants who did ($M=4.24$, $SD=1.71$) and did not drink ($M=4.22$, $SD=1.74$) on the day of their suicide attempts ($t(171)=-0.09$, $p=.926$). Mean lethality also did not differ between those who did ($M=3.68$, $SD=1.46$) and did not use drugs ($M=4.14$, $SD=1.80$) on the day of their suicide attempts ($t(171)=1.15$, $p=.251$). Nearly identical results were obtained when considering only those suicide attempts that occurred within the preceding year. Results of multilevel regression (see Table 3) indicated that none of the contextual factors were significantly associated with suicide attempt lethality.

We next conducted exploratory analyses to examine if number of standard drinks consumed, total duration of time drinking, and length of time between the last alcoholic drink and the suicide attempt were related to suicide attempt lethality. Among all suicide attempts, none of these variables were associated with attempt lethality, although a nonsignificant trend was observed for length of time between the last alcoholic drink and the suicide attempt: number of standard drinks ($B=0.00$, $SE=0.00$, $p=.856$), duration of drinking episode ($B=-0.01$, $SE=0.04$, $p=.698$), and time since last drink ($B=0.08$, $SE=0.05$, $p=.091$). Among suicide attempts during

the preceding year, only time since last drink was significantly associated with attempt lethality: number of standard drinks ($B=0.00$, $SE=0.10$, $p=.831$), duration of drinking episode ($B=-0.03$, $SE=0.04$, $p=.467$), and time since last drink ($B=0.11$, $SE=0.06$, $p=.045$). The direction of this effect indicated that suicide attempt lethality increased as the length of time since the last alcoholic drink increased.

4. Discussion

The present study sought to examine the association of alcohol consumption during the day of a suicide attempt with two important aspects of suicidal behavior: the length of time that passes from the initial suicidal impulse to the suicide attempt, and the overall lethality or severity of the suicide attempt. Consistent with expectations, results of the present study suggest that Soldiers acted upon their suicidal impulses more quickly when they had been drinking on the day of their suicide attempts. Also consistent with expectations, alcohol consumption on the day of the suicide attempt was not associated with lethality or medical severity of the suicide attempt. Finally, in keeping with prior studies, our hypothesis that drug use would not be associated with time elapsed from suicidal impulse to action or with attempt lethality was confirmed. Results were similar when considering all of the suicide attempts that occurred during military service as well as only those attempts that occurred during the previous year.

Nearly 90% of Soldiers in the present study stated their attempts occurred within a few hours of their suicidal impulse when they had been drinking alcohol on that day. By comparison, 70% of Soldiers who had not been drinking on the day of their attempt stated their attempts occurred within this same period of time. Overall, these findings align with prior research linking alcohol consumption with increased likelihood of “unplanned” or “impulsive” suicide attempts [3, 5-8, 14]. The present study builds on these earlier findings by quantifying the length of time

that elapsed from the suicidal impulse to the suicide attempt. Our results therefore provide a more nuanced understanding of how alcohol consumption facilitates the emergence of suicidal behavior, especially within the context of other risk factors and contextual variables known to be associated with suicidal behavior (e.g., interpersonal conflict, dysphoric mood states).

Our exploratory analyses suggested that although alcohol consumption in general was associated with faster transition from suicidal impulse to action, the number of standard drinks consumed and the total duration of the drinking episode were not associated with elapsed time from impulse to action. This aligns with previous research [14], and may suggest that even very small amounts of alcohol consumption on the day of a Soldier's suicide attempt can be just as risky as heavy consumption of alcohol. In light of neuroimaging research indicating that even low levels of alcohol consumption can significantly impact prefrontal cortex activity during executive function [24], it is plausible that the dis-inhibitory effects of low dose alcohol [25] may be sufficient to promote suicidal behavior. The observed association between alcohol consumption and impulsive suicide attempts may therefore be explained by alcohol-related impairments in cortico-limbic functions that are integral to inhibitory control and emotion regulation [26, 27]. Additional research is needed to test this hypothesis. The number of standard drinks consumed and duration of drinking episode were similarly unrelated to the lethality of the suicide attempt.

In contrast, recency of the last alcoholic drink was associated with slower transition from suicidal thought to action and increased medical lethality. This latter finding was statistically significant when considering only those suicide attempts that occurred during the preceding year; when considering all suicide attempts during military service, however, the relationship between recency of last alcoholic drink and increased medical lethality trended in the same direction but

was not statistically significant (i.e., $p=.091$). One possible explanation of this relationship is that Soldiers select more lethal methods as they “sober up” within the context of a suicidal crisis, whereas the methods employed during alcohol intoxication may be selected without regard for their likelihood of lethality. Alternatively, it is possible that Soldiers are more likely to overestimate the lethality of their suicide attempt methods while acutely intoxicated. Yet another possibility is that Soldiers begin drinking after making the decision to use a more lethal method in order to reduce their inhibitions and then discontinue drinking once in a sufficiently disinhibited state. This would result in a longer period of time from initial impulse to action. Because these findings were based on exploratory analyses, these conclusions should be seen as tentative only. Additional research is needed to further examine how alcohol use is related to attempt lethality among multiple attempters. Such research might provide some context for previous findings suggesting that alcohol use is somewhat more common among suicide attempters than suicide decedents [14, 28]. For example, alcohol use at the time of death by suicide may be relatively uncommon because more lethal suicidal behavior tends to occur after alcohol consumption has ceased. By extension, suicidal behavior may be less likely to be lethal during periods of active alcohol consumption.

In addition to alcohol consumption, results of the present study also suggest that interpersonal conflict is associated with significantly faster transition from suicidal impulse to action. Interpersonal conflict and relationship problems are the most commonly-reported stressors preceding suicide attempts and suicide deaths among military personnel [29, 30]. The present study extends these earlier findings by identifying one potential mechanism by which interpersonal conflict increases risk for suicidal behavior: facilitating the transition from suicidal impulse to action. Given the stressful nature of interpersonal conflict, and the known effects of

stress on biasing decision making towards impulsive responding [31], interpersonal conflict, like alcohol use, may have further reduced the ability to control suicidal impulses. Sudden or seemingly “unplanned” suicide attempts among Soldiers were therefore more likely to occur following an interpersonal conflict and/or alcohol consumption.

In contrast to these findings specific to the elapsed time from suicidal impulse to action, the only predictor variable that was significantly associated with the medical lethality of the suicide attempt was an argument or conflict with another person, although this relationship was only found among suicide attempts that occurred during the past year. This suggests that, overall, the environmental, emotional, and behavioral factors present during the time leading up to participants’ suicide attempts had less to do with the likelihood of their survival and/or the specific method chosen than they did with how quickly they acted upon their impulse. This converges with a considerable body of research finding an absence of association among attempt lethality, alcohol use, emotional distress, and suicidal intent [14, 36-38]. In sharp contrast, attempt lethality is strongly correlated with ease of access to means for suicide attempts [39, 40]. Alcohol use and other contextual factors may have less influence on the overall lethality of a Soldier’s suicide attempt as compared to speed with which he or she pursues and enacts methods that are most easily accessible. Alcohol consumption might therefore be especially risky because it shortens the window during which someone could intervene. This reduced window is especially critical for military personnel, who are more likely to die as a result of their suicide attempts due to their tendency to select more lethal methods in general [41].

The present study is not without limitations. First, because our sample was restricted to active duty U.S. Army personnel in outpatient mental health treatment, generalizability of results to other military and veteran groups should be made cautiously. Generalizability to military

personnel who are not receiving mental health treatment might also be limited. Second, the small number of female participants in the present study limited our ability to consider gender differences; additional studies with a larger number of female Soldiers are needed to determine if our findings would differ across both genders. Our use of retrospective recall of the context leading up to and surrounding past suicide attempts is another limitation of the present study, although this concern is mitigated to some degree by the fact that most of the suicide attempts assessed in the present study occurred in the very recent past (i.e., within the past year). Previous research suggests that retrospective recall of suicide attempts during the preceding year on the SASII has very high concordance with suicide attempts assessed on a weekly basis by treating clinicians (86% agreement) and reported on a weekly basis by participants during treatment (intraclass correlation coefficient=0.91). It is important to note, however, that retrospective recall may have been influenced by alcohol use at the time of the suicide attempt. Participants who endorsed drinking on the day of their suicide attempts tended to report very large quantities of alcohol consumption (i.e., 50 standard drinks during the course of three hours, on average) that could disrupt cognitive processes, which raises doubts about the accuracy of self-report. Conclusions specific to these exploratory analyses should therefore be considered preliminary until they can be replicated (or disconfirmed) using more objective assessment methods (e.g., blood alcohol content).

In a similar vein, future studies might redress the limitations specific to self-reported characteristics of suicide attempts by incorporating performance-based measures of impulsivity and inhibitory control (e.g., Stop Signal or Go/NoGo tasks) to assess the neurocognitive mediators of the association between alcohol consumption and suicide attempts. A final limitation is the use of SASII items to assess various aspects of alcohol consumption. Because

these items have not yet been rigorously examined for reliability and validity, results should be considered preliminary until additional studies using more well-established methods for assessing these constructs are conducted. Despite these limitations, the present study provides useful information about the role of alcohol consumption in the emergence of suicidal behavior during acute crises among military personnel, and suggests that alcohol hastens the transition from suicidal impulse to action.

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Table 1

Proportion of suicide attempts with each contextual factor during the preceding 24 hours, and associations among pre-attempt contextual factors (reported as phi coefficients), at any point during military service and during the previous year only

	% endorsed	1.	2.	3.	4.	5.	6.	7.	8.	9.	10.	11.	12.	13.
All suicide attempts during military service (n=175)														
1. Felt depressed	82.9	--												
2. Had argument or conflict with another person	52.6	.27**	--											
3. Felt anxious, afraid, or panicked	52.0	.25**	.22**	--										
4. Slept worse than usual	49.1	.06	.07	.10	--									
5. Felt out of control	44.0	.21**	.21**	.34**	.06	--								
6. Felt angry, frustrated, or enraged at yourself	42.9	.37**	.13	.14	.02	.23**	--							
7. Felt angry, frustrated, or enraged at someone else	41.7	.24**	.43**	.17*	-.01	.32**	.35**	--						
8. Drank alcohol	28.0	.15*	-.06	.13	-.06	.11	.10	-.05	--					
9. Asked someone for help	11.4	.02	.06	.07	-.04	.06	.14	.12	.01	--				
10. Ate more food than usual	10.9	.10	.07	.08	.17*	.09	.00	.04	.03	.10	--			
11. Took illegal drugs or more than prescribed amount of medications	7.4	.01	.04	.10	-.01	.01	.06	.03	.21**	.04	.33**	--		
12. Received requested help	1.7	-.06	.03	.04	-.12	-.12	.06	.07	.11	.36**	-.04	.13	--	
13. Engaged in illegal behavior (other than drug use)	1.7	-.17*	-.05	.04	-.04	.06	-.02	.07	.02	.09	-.04	-.04	-.02	--
Suicide attempts during previous year (n=121)														
1. Felt depressed	83.1	--												
2. Had argument or conflict with another person	57.3	.31**	--											
3. Felt anxious, afraid, or panicked	54.8	.33**	.23**	--										
4. Slept worse than usual	52.4	.10	.11	.03	--									
5. Felt out of control	41.1	.29**	.16	.36**	.03	--								
6. Felt angry, frustrated, or enraged at yourself	45.2	.37**	.16	.14	.01	.26**	--							
7. Felt angry, frustrated, or enraged at someone else	42.7	.30**	.35**	.16	-.04	.34**	.43**	--						
8. Drank alcohol	29.8	.14	-.06	.12	-.03	.16	.04	-.08	--					
9. Asked someone for help	12.9	.03	.03	.05	-.12	.11	.18*	.10	.01	--				
10. Ate more food than usual	12.1	.16	.06	.08	.15	.14	.06	.02	.02	.15	--			
11. Took illegal drugs or more than prescribed amount of medications	7.3	.04	.11	.06	-.11	.02	.06	.07	.22*	-.02	.28**	--		
12. Received requested help	1.6	-.12	-.02	-.02	-.14	-.11	.01	.02	.06	.33**	-.05	.21*	--	
13. Engaged in illegal behavior (other than drug use)	1.6	-.12	-.02	.12	-.01	.02	.01	.02	.06	.14	-.05	-.04	-.02	--

*p<.05, **p<.01

Table 2

Association of alcohol consumption on the day of the suicide attempt and elapsed time from suicidal impulse to action

Elapsed time	All suicide attempts (n=175)		Suicide attempts during prior year (n=121)	
	Yes	No	Yes	No
Multiple days	4.1	0.0	5.4	0.0
Less than two days	6.1	25.8	5.4	27.4
Less than one day	0.0	4.0	0.0	3.6
Hours or less	89.8	70.2	89.2	69.0

Table 3

Results of multilevel regression analyses predicting elapsed time from suicidal impulse to action and suicide attempt lethality

Contextual factor	All suicide attempts			Suicide attempts during prior year		
	B	SE	p	B	SE	p
Elapsed time from impulse to action						
Felt depressed	0.13	0.20	.509	-0.15	0.26	.953
Had argument or conflict with another person	-0.44	0.14	.003	-0.44	0.18	.015
Felt anxious, afraid, or panicked	0.28	0.14	.047	0.24	0.18	.186
Slept worse than usual	0.03	0.13	.807	-0.07	0.16	.683
Felt out of control	0.17	0.15	.259	0.17	0.19	.363
Felt angry, frustrated, or enraged at yourself	-0.16	0.14	.269	-0.05	0.18	.805
Felt angry, frustrated, or enraged at someone else	0.15	0.16	.348	0.21	0.19	.275
Drank alcohol	-0.43	0.15	.004	-0.42	0.18	.025
Asked someone for help	-0.19	0.22	.381	-0.34	0.27	.739
Ate more food than usual	-0.07	0.22	.754	0.09	0.28	.739
Took illegal drugs or extra medications	0.08	0.26	.746	0.25	0.34	.464
Lethality						
Felt depressed	-0.21	0.41	.605	0.12	0.50	.810
Had argument or conflict with another person	0.43	0.30	.156	0.75	0.35	.033
Felt anxious, afraid, or panicked	0.12	0.30	.690	-0.21	0.34	.549
Slept worse than usual	0.42	0.27	.124	0.01	0.32	.985
Felt out of control	0.31	0.30	.306	0.44	0.36	.229
Felt angry, frustrated, or enraged at yourself	0.19	0.31	.541	0.02	0.36	.961
Felt angry, frustrated, or enraged at someone else	-0.46	0.33	.165	-0.35	0.38	.359
Drank alcohol	-0.08	0.31	.799	-0.23	0.36	.527
Asked someone for help	0.52	0.42	.225	0.15	0.52	.769
Ate more food than usual	0.00	0.46	.998	0.05	0.54	.932
Took illegal drugs or extra medications	0.12	0.55	.831	-0.82	0.67	.222

Note: Two variables (received requested help, engaged in illegal behavior other than drug use) were excluded due to low cell counts leading to model specification errors.